UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P O Box 1450
Alexandria, Virginia 22313-1450
www uspto gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,879	03/04/2004	Takuya Nagai	118886	2001

25944 7590 06/24/2009
OLIFF & BERRIDGE, PLC
P.O. BOX 320850
ALEXANDRIA, VA 22320-4850

EXAMINER	
KHAN, OMER S	

ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
06/24/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/791,879	NAGAI ET AL.
	Examiner	Art Unit
	Omer S. Khan	2612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,18,20,22-26,28,30-35,39-42 and 45-47* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,18,20,22-26,28,30-35,39-42 and 45-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This communication is in response to amendments filed on 04/21/2009.

2. Claims 1-14, 18, 20, 22-26, 28, 30-35, 39-42, and 45-47 are pending in this application. By this Amendment, claims 28 and 39 are amended. Claims 45-47 are newly added.

3. Applicant's argument with respect to "a distance detecting portion operable to detect a distance between said interrogator and said endpoint device," is not persuasive.

4. Previously, examiner stated that applicant admits Nysen discloses determining the strength of the signal of received signals using a received signal indicator circuit (RSSI) and the communication based on signal strength. If the strength of the signal is used to eliminate the tags that are out of range and creating noise than the system is determining the 'relative' distance between the receiver and the tags and eliminating the ones that are not in the effective communication range. The claims require detecting the distance between the interrogator and the endpoint device (tag). The interrogator of Nysen is made of a receiver element and an antenna. The applicant admits that Nysen detects the distance between the antenna (which is part of the interrogator) and the tag See Remarks dated 06/16/2008 page 18 ¶ 2. Therefore Nysen meets this limitation.

5. In the outstanding Remarks, applicant is arguing that Nysen does not know the power of its transmitted signal from the tag, and therefore cannot determine a distance from the tag. In particular, [... the strength of a received signal strength depends on

both the distance the signal traveled between the transmission and the reception, and the strength of the signal at the point of transmission. Nysen fails to disclose that the system knows or can determine the signal strength of the transmitted signal. Thus, Nysen's system cannot determine the distance between the interrogator and the tag]. Applicant argument is beyond the scope of the claimed limitation. Applicant is not claiming to determine the strength of a transmitted signal. Furthermore, it is to be noted that applicant is claiming a device that is operable to detect “a” distance and not claiming to calculate a discreet levels of distance. Examiner respectfully disagrees with applicant's understanding of prior art, because Nysen’s interrogator knows the strength of signal from each lane as well as the distance of each lane from the interrogator. Therefore, the system can anticipate the distance based on signal strength.

6. In col. 35, Nysen discusses the discrimination between the signals from each lane based on the strength. In order to determine a SNR, signal to noise ratio for eliminating noisy tag. The interrogator must know the power of the signal as well as the power of noise. In order to eliminating tag solely based on their signal strength, the interrogator must know the power of the signal. If the interrogator can eliminate a tag, based on the strength of the signal, in a second lane the interrogator knows that it is detecting a tag at least “a distance” of 25 feet away.

7. Examiner has cited another prior art in the conclusion section for better understanding of Nysen, to support the argument above, and to explain that RSSI is used to calculate distance and not only to determine the signal strength.

8. Applicant's argument with respect to "an available band determining portion operable to determine an available frequency band ... on the basis of said condition of communication detected by said communication condition detecting portion," is not persuasive.

9. Previously examiner stated that the argument is beyond the scope of the claim; nevertheless, Rodger teaches that limitation, (See Rodger, col. 11 l. 66 – col. 12 l. 16). Applicant is actually claiming "an available band determining portion operable to determine an available frequency band of a subcarrier signal available for said at least one endpoint device on the basis of said condition of communication detected by said communication condition detecting portion," examiner has stated in previous office action that Maclellen teaches that limitation, (See MacLellan, Fig 9, col. 11 l. 31-50, where MacLellan discusses the interrogator is design to determining the frequency of a sub carrier signal within the frequency band).

10. Applicant is claiming to detect at least one of the three conditions. The communication between the tag and the interrogator is based on any one of three communication condition.

11. One of the conditions for communication is the collision rate, i.e. number of collision and another condition for communication is an amount of data error. MacLellan explicitly teaches Variable Uplink Data Rate to minimize noise, i.e. amount of error or collision. See MacLellan Col. 16 l. 17-32, where he discusses it would be possible for the Interrogator 101 to instruct the Tag 102 to modify the Uplink Signal 105 data rate to minimize noise. The Interrogator 101 could monitor the signal quality and error

characteristics of the Uplink Signals 105. In the event that the Uplink Signals 105 are being received with an unacceptable signal-to-noise ratio, but if no evidence of Collisions (see FIG. 3) are present, then a reasonable action the Interrogator could take would be to instruct the Tags in the reading field to decrease the data rate of the Uplink Signal 105. This would increase the "energy per bit" of the received Uplink Signal 105. As discussed above, using a DSP as a Subcarrier Demodulator 1105, the Interrogator 101 could also decrease the noise bandwidth within that DSP.

12. In the outstanding Remarks, applicant argues, [The Office Action cites MacLellan as allegedly disclosing this feature (Office Action at page 5). However, MacLellan explicitly states that "as long as the Subcarrier 908 frequency is large enough to support [a] data rate, as discussed above, the actual Subcarrier 908 frequency need not be altered" (MacLellan C 15:L57-58). The available-band determining portion recited in the claims is determining or adjusting the frequency band on the basis of the communication-condition-detecting portion in response to, for example, collisions or a certain collision rate. Thus, MacLellan teaching not to change the frequency does not disclose changing the frequency as recited in claims 13 and 26...]. Applicant is not claiming to alter the subcarrier in this particular limitation. However; if the subcarrier is not large enough to support the data, the system will alter and determine the subcarrier frequency which is suitable to carry the data as explicitly stated in col. 15 l. 47-49, where the data rate and subcarrier frequency are related so that the subcarrier frequency which has bandwidth large enough to carry the data.

13. There is no need to alter the data rate if there is no collision and no error. However, as explicitly stated in col. 16 l. 18-26, the Interrogator 101 to instruct the Tag 102 to modify the Uplink Signal 105 data rate to minimize noise. The Interrogator 101 could monitor the signal quality and error characteristics of the Uplink Signals 105. In the event that the Uplink Signals 105 are being received with an unacceptable signal-to-noise ratio, but if no evidence of Collisions (see FIG. 3) are present, then a reasonable action the Interrogator could take would be to instruct the Tags in the reading field to decrease the data rate of the Uplink Signal 105.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-14, 18, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nysen: US 6107910, and further in view of Rodger: US 6362737 and further in view of Maclellan: US 5940006.

Claims 28, 30-33, 35 and 39-42, are rejected under 35 U.S.C. 103(a) as being unpatentable over Nysen: US 6107910, and further in view of Rodger: US 6362737 and

further in view of MacLellan: US 5940006 and further in view of Janning in US 20010040508.

In an effort to save printing paper, examiner has combined the claims of the above stated two rejections.

Consider claims 1 and 28, Nysen discloses an endpoint device for use in a communication system wherein the endpoint device which has received an interrogating signal containing a main carrier and transmitted from an interrogator responds to the interrogator with a reflected signal which is generated by modulating the main carrier with appropriate information, **(See Nysen, Abstract, col. 6 l. 43- 59, col. 31 l. 54-65, where Nysen discusses a transponder or a tag for receiving an interrogation signal and transmitting a backscatter in a main carrier to an interrogator or reader).** Nysen discloses the said endpoint device comprising a distance detecting portion operable to detect a distance between said interrogator and said endpoint device, **(See Nysen, Fig 36-38, col. 34 l. 48 col. 35 l. 38, where Nysen discusses a transponder comprises a distance measuring mechanism that measures a distance between the interrogator and the tag).** Nysen discloses a reflecting portion operable to receive and reflect said interrogating signal transmitted from said interrogator, **(See Nysen, Abstract, col. 4 l. 57-65, col. 8. l. 48- 64, where Nysen discusses a backscatter component for receiving a ping and transmitting a ping response).** Nysen discloses an information generating portion operable to generate replying information to be transmitted to said interrogator, **(See Nysen, col. 14 l. 56-67,**

where Nysen discusses a microprocessor 76 for generating a response for interrogation). Rodger 6362737 in view of Nysen discloses a band determining portion operable to determine, on the basis of said distance detected by said distance detecting portion, **(Rodger, col. 2 l. 20 25, col. 11 l. 66 – col. 12 l. 16, where Rodger in view of Nysen discusses a band is determined based on the signal strength that is inversely proportional to the distance i.e. the range of frequencies includes a resonance frequency of each tag which varies based on a mutual inductance occurring between the antenna coils of overlapped tags).** Nysen discloses a frequency band of a modulating signal used to modulate a reflected signal generated by said reflecting portion, **(See Nysen, col. 8. l. 48- 64, col. 14 l. 45-63, where Nysen discusses a frequency band used to modulate the back scatter signal).** Nysen discloses a modulating signal generating portion operable, according to said replying information generated by said information generating portion, **(See Nysen, Fig 30, col. 9 l. 49-67, where Nysen discusses a frequency modulator 420 used to modulate the response for interrogation signal based on the reply received from the processor).** Nysen discloses the modulator generate said modulating signal having a frequency within said frequency band determined by said band determining portion, **(See Nysen, col. 14 l. 45-63, col. 31 l. 54-67, where Nysen discusses the generation of modulating signal within a frequency band 905-925 MHz).** Maclellan 5940006 in view of Nysen discloses the said endpoint device comprising a frequency determining portion operable to determine a frequency of a subcarrier signal used by the endpoint device, within an available frequency band which has been determined by

said interrogator, **(See Maclellan, Fig 9, col. 11 l. 31-50, where Maclellan discusses the tag is design to determining the frequency of a sub carrier signal within the frequency band).** Maclellan in view of Nysen a frequency utilization ratio setting portion operable to set a distribution of a frequency utilization ratio of a subcarrier signal used to modulate said main carrier, **(See Maclellan, Fig 8, col. 12 l. 5-30, where Maclellan discusses the system is design to set the distribution frequency in ratio such as channels by selecting one of predetermine frequency channel within the entire frequency range of the subcarrier signals).** Maclellan in view of Nysen discloses the over a predetermined range of frequency of the subcarrier signal which consists of a plurality of mutually adjacent frequency channels, **(See Maclellan, col. 12 l. 50-53, where Maclellan discusses the sub carrier signal consists of a multiple adjacent frequency channels in a predetermined range).** Maclellan in view of Nysen discloses a frequency determining portion operable on the basis of the distribution of the frequency utilization ratio set by said frequency utilization ratio setting portion, FURSP, **(See MacLellan, col. 12 l. 5-30, where MacLellan discusses the frequency synthesizer determines the frequency of the sub carrier signal based on the frequency set by the processor).** Maclellan discloses the FURSP to determine a frequency of said subcarrier signal by random selection within said predetermined range of frequency, **(See Maclellan, col. 11 l. 31-50, where MacLellan discusses the frequency synthesizer determines the frequency of the sub carrier signal by random selection within the defined range of frequency, i.e. freq hopping).** Rodger discloses a battery cell; and a power-source-information detecting portion

operable to detect the operating state of said battery cell, the operating condition of the battery cell being at least able to power the endpoint device, **(See Rodger col. 9 l. 57-67, col. 11-55-59, and col. 41 l. 55-59, where he discusses that transceiver may include a battery).** MacLellan discloses wherein said FURSP is operable on the basis of the operating state of said battery cell detected by said power-source-information detecting portion to set the distribution of the frequency utilization ratio of the subcarrier signal, **(See MacLellan, col. 9 l. 1-26, col. 11 l. 31-50, col. 13 l. 27-45, where MacLellan discusses the frequency synthesizer sends a uplink signal when a battery has some power, i.e. the operating state of the battery cell, if the battery is dead then there is no signal from a battery driven tag).**

Nysen and the others don't exactly discusses the monitoring at least two states of the battery. In an analogous art, Janning discloses a battery-powered RF transponder system to monitor the whereabouts of livestock. Janning discloses microprocessor 281 checks for a low battery condition and causes LED 308 to blink if battery 138 is determined to be low. This is accomplished simply by reading input port RB4 at pin 10 of microprocessor 281 and generating an intermittent output signal at output port RA2 in the event the status of port RB4 indicates that low voltage detector 307 detects a voltage of less than 2.35 volts at power supply rail 283, See Janning ¶ 137.

It would have been obvious to an ordinary skilled artisan at the time of invention to modify the invention above and include a battery monitoring indicator so the user can replace or recharge the battery before the battery completely runs out and the transponder becomes non-responsive do to the lack of power; Therefore, providing

convenience to the user.

Consider claims 1-14, 18, 20, 22-26, 28, 30-35 and 39-42, Nysen does not specifically discloses a band determined based on the distance detected, and other limitations in this application that directly depend on this limitation; nevertheless, it would be obvious to one of ordinary skill in the art at the time of invention to modify the invention of Nysen and design this system with a feedback element in fig 44A to determine the band based on signals amplitude, and integrate most of the circuitry in the interrogator to reduce the size and the cost of the transponder as taught by Rodger to design a system that can communicate in multiple band in an effort to reduce power consumption and tag collision by the system, **(See Rodger col. 1 l. 38-45 and col. 2 l. 4-8).**

Consider claims 1-14, 18, 20, 22-26, 28, 30-35 and 39-42, Nysen does not specifically discloses a subcarrier signal, and other limitations in this application that directly depend on this limitation; nevertheless, it would be obvious to one of ordinary skill in the art at the time of invention to modify the invention of Nysen and design this system where the main carrier comprises subcarrier frequency as taught by Maclellan in an effort to reduce the cost and collision of the tags and increase amount of tags that can communicated with the interrogator in a small period, **(See Maclellan col. 1 l. 30-36).**

Consider claims 12, and 13, Nysen discloses a communication system

comprising an interrogator operable to transmit an interrogating signal containing a main carrier, and an endpoint device operable to receive the interrogating signal and respond to the interrogator with a reflected signal that is generated by modulating the main carrier with appropriate information, **(See Nysen, Abstract, col. 6 l. 43- 59, col. 31 l. 54-65, where Nysen discusses a transponder or a tag for receiving an interrogation signal and transmitting a backscatter in a main carrier to an interrogator or reader).**

Nysen discloses wherein the interrogator including a distance detecting portion operable to detect a distance between said interrogator and said endpoint device, **(See Nysen, Fig 36-38, col. 38 l. 34-40, where Nysen discusses the interrogator comprises a distance measuring mechanism that measures a distance between the interrogator and the tag).** Nysen discloses the distance is measure on the basis of an intensity of a modulating signal with which said reflected signal has been modulated in said endpoint device, **(See Nysen, Fig 36-38, col. 34 l. 48 col. 35 l. 38, col. 38 l. 34-40, where Nysen discusses the distance is measured based on the strength of the signal).** Nysen discloses the said interrogator further including a distance information transmitting portion operable to transmit to said endpoint device distance information indicative of the distance detected by said distance detecting portion, **(See Nysen, Fig 44A, col. 38 l. 15-40, where Nysen discusses a transmitter for transmitting the signal and the circuitry for detecting the distance of that signal).** Rodger discloses the said interrogator including a communication condition

detecting portion operable to detect a condition of communication of the interrogator with said at least one endpoint device on the basis of at least one of a collision rate among the reflected signal transmitted from a plurality of end point devices, the number of occurrences of collision among the reflected signals transmitted from said plurality of endpoint devices per unit time, and an amount of error data contained in said reflected signal transmitted from each end point device, **(See Rodger, col. 9 l. 57-67, where discusses a system for checking the communication condition i.e. signal strength, on the basis of inaccurate data communication).** Rodger discloses a frequency band is determined on the basis of said condition of communication detected by said communication condition detecting portion, **(See Rodger, col. 11 l. 66 – col. 12 l. 16, where Rodger in view of Nysen discusses a band is determined based on the signal strength that is inversely proportional to the distance).** Maclellan in view of Nysen discloses an available band determining portion operable to determine an available frequency band of a subcarrier signal available for said at least one endpoint device, **(See Maclellan, Fig 9, col. 11 l. 31-50, where Maclellan discusses the interrogator is design to determining the frequency of a sub carrier signal within the frequency band).** Maclellan discloses a band information transmitting portion operable to transmit to each endpoint device band information representative of said available frequency band of said subcarrier signal determined by said available band determining portion, **(See Maclellan, Fig 9 and 10, col. 11 l. 31-50, where Maclellan discusses the tag comprises a transmitter and the tag is design to determining the transmission the frequency of a sub carrier signal within the frequency band).**

MacLellan discloses the condition of communication being at least able to permit communication between the interrogator and at least one endpoint device, **(See MacLellan Col. 15 l. 35 to col. 16 l. 32, where he discusses it would be possible for the Interrogator 101 to instruct the Tag 102 to modify the Uplink Signal 105 data rate to minimize noise).**

Nysen discloses the said endpoint device including, a reflecting portion operable to receive said interrogating signal containing said main carrier, and transmit said reflected signal to said interrogator, **(See Nysen, Abstract, col. 4 l. 57-65, col. 8. l. 48-64, where Nysen discusses a backscatter component for receiving a ping and transmitting a ping response).** Nysen discloses an information generating portion operable to generate replying information to be transmitted to said interrogator, **(See Nysen, col. 14 l. 56-67, where Nysen discusses a microprocessor 76 for generating a response for interrogation).** Rodger discloses a band determining portion operable to determine a frequency band of said modulating signal, on the basis of said distance information received from said distance information transmitting portion, **(See Rodger, col. 11 l. 66 – col. 12 l. 16, where Rodger in view of Nysen discusses a band is determined based on the signal strength that is inversely proportional to the distance where the processor can be program to determine the band).** Nysen discloses a modulating signal generating portion operable, according to said replying information generated by said information generating portion, **(See Nysen, Fig 30, col. 9 l. 49-67, where Nysen discusses a frequency modulator 420 used to modulate the response for interrogation signal based on the reply received from**

the processor). Nysen discloses the modulating signal is generated having a frequency within said frequency band determined by said band determining portion, **(See Nysen, col. 14 l. 45-63, col. 31 l. 54-67, where Nysen discusses the generation of modulating signal within a frequency band 905-925 MHz).** Maclellan discloses at least one endpoint device including a frequency determining portion operable to determine a frequency of said subcarrier signal within said available frequency band represented by said band information received from said band information transmitting portion of said interrogator, **(See Maclellan, col. 12 l. 5-30, where MacLellan discusses the frequency synthesizer determines the frequency of the sub carrier signal based on the frequency set by the processor).**

Consider claim 26, Nysen discloses an interrogator for transmitting an interrogating signal containing a main carrier to at least on of endpoint device, and at least one of endpoint device responding to the interrogator with respective reflected signals that is generated by modulating the main carrier with appropriate information, **(See Nysen, Abstract, Fig 36-38, col. 6 l. 43- 59, col. 9 l. 17-26, col. 31 l. 54-65, col. 34 l. 48 col. 35 l. 38, col. 38 l. 34-46, where Nysen discusses a set of transponders or tags for receiving an interrogation signal and transmitting a backscatter in a main carrier to an interrogator or reader. The interrogator is design to set the distribution frequency in ratio using the backscatter information of a plurality of tags. The interrogator is capable of monitoring the tags and the distance is measured based on the different levels of the signal strength. The transmission**

signal containing the main carrier modulated with data generated by the processor). Nysen discloses said interrogator comprising a communication condition detecting portion operable to detect a condition of communication of the interrogator with each endpoint device, **(See Nysen, col. 38 l. 34-40, where discusses a system for checking the communication condition i.e. signal strength).** Rodger discloses wherein said communication-condition detecting portion operable to detect said condition of communication on the basis of at least one of a collision rate among the reflected signals transmitted from the at least one endpoint device, the number of occurrences of collision among the reflected signals transmitted from the at least one endpoint device per unit time, and an amount of error data contained in said reflected signal transmitted from each of the at least endpoint device; **(See Rodger, col. 9 l. 57-67, where discusses a system for checking the communication condition i.e. signal strength, on the basis of inaccurate data communication).** Maclellan discloses an available band determining portion operable to determine an available frequency band of a subcarrier signal available for said at least one endpoint device, **(See Maclellan, Fig 9, col. 11 l. 31-50, where Maclellan discusses the interrogator is design to determining the frequency of a sub carrier signal within the frequency band).** Rodger discloses the band is determine on the basis of said condition of communication detected by said communication condition detecting portion, **(See Rodger, col. 11 l. 66 – col. 12 l. 16, where Rodger in view of Nysen discusses a band is determined based on the signal strength that is inversely proportional to the distance).** Maclellan discloses a band information transmitting portion operable

to transmit to each endpoint device band information representative of said available frequency band of said subcarrier signal determined by said available band determining portion, **(See Maclellan, Fig 9 and 10, col. 11 l. 31-50, where Maclellan discusses the interrogator comprises a transmitter and the interrogator determines the transmission frequency of a sub carrier signal within the frequency band).**

MacLellan discloses <u>the condition of communication being at least able to permit communication between the interrogator and at least one endpoint device,</u> **(See MacLellan Col. 15 l. 35 to col. 16 l. 32, where he discusses it would be possible for the Interrogator 101 to instruct the Tag 102 to modify the Uplink Signal 105 data rate to minimize noise).**

Consider claim 39, Nysen discloses a communication system comprising an interrogator having a transmitting portion operable to transmit an interrogating signal containing a main carrier, and a plurality of endpoint devices each operable to receive the interrogating signal and respond to the interrogator with a reflected signal which is generated by modulating the main carrier with appropriate information, wherein an improvement comprises, **(See Nysen, Abstract, col. 6 l. 43- 59, col. 31 l. 54-65, where Nysen discusses a set of transponders or tags for receiving an interrogation signal and transmitting a backscatter in a main carrier to an interrogator or reader).** Maclellan discloses <u>the endpoint device</u> including an individual frequency utilization ratio setting portion operable to set a distribution of an individual frequency utilization ratio of a subcarrier signal used to modulate said main carrier, **(See**

Maclellan, Fig 8, col. 12 l. 5-30, where Maclellan discusses the tag is design to set the distribution frequency in ratio such as channels by selecting one of predetermine frequency channel within the entire frequency range of the subcarrier signals). Maclellan discloses the main carrier is modulated over a predetermined range of frequency of the subcarrier signal which consists of a plurality of mutually adjacent frequency channels, **(See Maclellan, col. 12 l. 50-53, where Maclellan discusses the sub carrier signal consists of a multiple adjacent frequency channels in a predetermined range).** Maclellan discloses a frequency determining portion operable on the basis of the distribution of the individual frequency utilization ratio set by said individual frequency utilization ratio setting portion, **(See Maclellan, col. 12 l. 5-30, where MacLellan discusses the frequency synthesizer determines the frequency of the sub carrier signal based on the frequency set by the processor).** Maclellan discloses the tag is design to determine a frequency of said subcarrier signal, by random selection within said predetermined range of frequency, **(See Maclellan, col. 11 l. 31-50, where MacLellan discusses the frequency synthesizer determines the frequency of the sub carrier signal by random selection within the defined range of frequency, i.e. freq hopping).** Nysen discloses a battery cell, **(See Nysen, col. 13 l. 38-40, where Nysen discusses tag comprises a power source or obtain energy from the RF signal where the coil becomes the power source).** Nysen discloses a power source information detecting portion operable to detect supply voltage information indicative of a supply voltage of said battery cell, **(See Nysen, col. 13 l. 38-40, col. 35 l. 59-67, where discusses the RF signal**

contains RF energy and signal strength translates the power information).

Nysen discloses the said interrogator including an overall frequency utilization ratio determining portion operable to determine a distribution of an overall frequency utilization ratio of the reflected signal received from said plurality of endpoint devices, **(See Nysen, col. 38 l. 41-46, where Nysen discusses the interrogator is design to set the distribution frequency in ratio using the backscatter information).** Nysen discloses an endpoint device monitoring portion operable on the basis of said supply voltage information received from said power source information detecting portion, **(See Nysen, Fig 36-38, col. 38 l. 34-40, where Nysen discusses the interrogator is capable of monitoring a distance between the interrogator and the tag based on signal strength).** Nysen discloses the interrogator's EPDMP is capable to determines one of a plurality of predetermined supply voltage ranges in which the supply voltage of said battery cell detected by said power source information detecting portion of said each endpoint device falls, **(See Nysen, Fig 36-38, col. 34 l. 48 col. 35 l. 38, col. 38 l. 34-40, where Nysen discusses the distance is measured based on the different levels of the signal strength).** Nysen discloses a switching information generating portion operable on the basis of the distribution of said overall frequency utilization ratio determined by said overall frequency utilization ratio determining portion, **(See Nysen, col. 38 l. 41-46, where Nysen discusses a processor for generating an interrogation signal based on distribution frequency).** Rodger discloses the processor is operable on the basis of the result of determination by said endpoint device

monitoring portion, **(See Rodger, col. 11 l. 66 – col. 12 l. 16, where Rodger in view of Nysen discusses a band is determined based on the signal strength that is inversely proportional to the distance).** Maclellan discloses the interrogator is design to generate switching information on the basis of which said individual frequency utilization ratio determining portion of said each endpoint device sets the distribution of said individual frequency utilization ratio of the subcarrier signal, **(See Maclellan, Fig 9, col. 11 l. 31-50, where Maclellan discusses the tag is design to determining the frequency of a sub carrier signal within the frequency band).** Maclellan discloses the said transmitting portion of said interrogator being operable to transmit said interrogating signal containing said main carrier and said switching information generated by said switching information generating portion, **(See Maclellan, Fig 9 and 10, col. 11 l. 31-50, where Maclellan discusses the interrogator comprises a transmitter and the interrogator determines the transmission frequency of a sub carrier signal within the frequency band).** Maclellan discloses the said individual frequency utilization ratio setting portion being operable to set the distribution of said individual frequency utilization ratio of the subcarrier signal of said each endpoint device, **(See Maclellan, col. 12 l. 5-30, where MacLellan discusses the frequency synthesizer capable of determining the individual frequency of the sub carrier signal).** on the basis of said switching information generated by said switching information generating portion and said supply voltage of said battery cell detected by said power source information detecting portion, **(See Maclellan, col. 12 l. 5-30, where MacLellan discusses the frequency synthesizer determines the frequency of the**

sub carrier signal based on the frequency set by the processor after the comparison of signal's strength).

Nysen and the others don't exactly discusses the monitoring at least two states of the battery. In an analogous art, Janning discloses a battery-powered RF transponder system to monitor the whereabouts of livestock. Janning discloses microprocessor 281 checks for a low battery condition and causes LED 308 to blink if battery 138 is determined to be low. This is accomplished simply by reading input port RB4 at pin 10 of microprocessor 281 and generating an intermittent output signal at output port RA2 in the event the status of port RB4 indicates that low voltage detector 307 detects a voltage of less than 2.35 volts at power supply rail 283, See Janning ¶ 137.

Consider claim 2, Rodger discloses the endpoint device according to claim 1, wherein said band determining portion is operable to determine said frequency band so that a center frequency of the determined frequency band increases with a decrease in said distance detected by said distance detecting portion, **(See Rodger, col. 11 l. 66 – col. 13 l. 23, where Rodger discusses a band is determined where the frequency shift with respect to the distance which is inversely proportional to the amplitude, lower bands carry more RF energy than the higher bands; therefore, the frequency will increase as distance decreases).**

Consider claims 3, 4 and 5, the combination of Nysen and Rodger teaches the endpoint device according to claim 1, wherein said band determining portion is operable to determine said frequency band on the basis of said distance detected by said distance detecting portion, and according to a predetermined data table representative of a relationship between a plurality of ranges of said distance and a plurality of frequency bands which respectively correspond to said plurality of ranges of said distance and each of which consists of a group of a plurality of mutually adjacent frequency channels, said band determining portion being operable to select, randomly or according to a predetermined rule, one of said plurality of channels of the group corresponding to one of said plurality of ranges to which the distance detected by said distance detecting portion belongs, and according to a predetermined data table representative of a relationship between said distance and said frequency band, **(Rodger, Fig 3, col. 11 l. 66 – col. 13 l. 23, col. 17 l.1 -45, where Rodger discusses a band is determined based on the signal strength that is inversely proportional to the distance and a table derived from a mathematical equation as a function amplitude vs. frequency, i.e. the range of frequencies includes a resonance frequency of each tag which varies based on a mutual inductance occurring between the antenna coils of overlapped tag. Select channels of corresponding to the ranges to which the distance detected according to a pseudo-random frequency hopping algorithm representing the distance and their frequency band).**

Consider claim 6, Maclellan discloses the endpoint device according to claim 1 wherein said modulating-signal generating portion is operable to generate said modulating signal in one of a plurality of time frames which is selected randomly or according to a predetermined rule, **(See Maclellan, col. 11 l. 5 – col. 12 l. 63, where MacLellan discusses the frequency synthesizer generates signal in pseudo-random time slots for freq hopping).**

Consider claim 7, Maclellan discloses the endpoint device according to claim 1, wherein said modulating-signal generating portion maintains the frequency band determined by said band determining portion, until transmission of said replying information to said interrogator is completed, **(See Maclellan, col. 11 l. 5 – col. 12 l. 63, where MacLellan discusses the modulator maintains the frequency until transmission is completed).**

Consider claims 8, 9, 10, and 11, the combination of Nysen and Rodger teaches the endpoint device according to claim 1, further comprising a charging portion operable to charge the endpoint device with an electric energy derived from said interrogating signal, and wherein said charging portion activating the endpoint device when an amount of said electric energy stored in said endpoint device has reached a predetermined value, the said distance detecting portion is operable to detect said distance between said interrogator and said endpoint device, on the basis of a change of the electric energy with which the endpoint device is charged by said charging

portion, a voltage detecting portion operable to detect a voltage of said charging portion, and wherein said distance detecting device detects the change of said electric energy on the basis of the voltage detected by said voltage detecting portion, wherein said distance detecting portion is operable to detect said distance on the basis of an intensity of said interrogating signal, **(Nysen, Fig 36-38, col. 34 l. 48 col. 35 l. 38, where Nysen discusses the tag is supplied with an RF energy of the signal, i.e. the range of frequencies includes a resonance frequency of each tag which varies based on a mutual inductance occurring between the antenna coils of overlapped tag. The coil stores the charge and act as a primary or secondary voltage supply for the tag and the charge depends on the intensity of the signal).**

Consider claim 14, Rodger discloses the communication system according to claim 13, wherein said available-band determining portion is operable to change an upper limit of said available frequency band on the basis of said condition of communication detected by said communication-condition detecting portion, **(See Rodger, col. 11 l. 66 – col. 13 l. 23, where Rodger discusses a use of upper bands of a subscan, higher bands carry less RF energy than the lower bands; therefore, raising the frequency will help the signal reach tags and save power consumption when the tag is in a good communication range).**

Consider claim 18, Rodger discloses the communication system according to claim 13, wherein said available-band determining portion is operable to determine said

available frequency band so that an upper limit of said available frequency band increases with an increase in said at least one of said collision rate, said number of occurrences of collision and said amount of error data, which has been detected by said communication-condition detecting portion, **(See Rodger, col. 11 l. 66 – col. 13 l. 23, Table 1 and 2, where Rodger discusses a use of frequency bands where the number subscan will increase as the Q, the quality index of a signal decreases, and amount of noise received increases i.e. SNR).**

Consider claim 25, Maclellan discloses the communication system according to claim 13, wherein said frequency determining -portion of said each endpoint device is operable to determine the frequency of said subcarrier signal, by selecting, by means of random hopping or according to a predetermined rule of hopping, one of a plurality of frequency channels set within said available frequency band determined by said available-band determining portion of said interrogator, said frequency determining portion **(See Maclellan, col. 11 l. 31-50, where MacLellan discusses the frequency synthesizer determines the frequency of the sub carrier signal by random selection within the defined range of frequency, i.e. freq hopping).**

Consider claim 30, Rodger discloses the endpoint device according to claim 28, wherein said frequency-utilization-ratio setting portion is operable to lower a center frequency of the distribution of the frequency utilization ratio of the subcarrier signal, when a supply voltage of said battery cell detected by the power-source-information detecting portion is lower than a predetermined threshold value, **(See Rodger, col. 11 l.**

66 – col. 13 l. 23, where Rodger discusses a use of lower bands of a subscan, lower bands carry more RF energy than the higher bands; therefore, lowering the frequency will help the signal reach tags at a far distance).

Consider claim 31, Rodger discloses the endpoint device according to claim 28, wherein said frequency-utilization-ratio setting portion is operable to raise a center frequency of the distribution of the frequency utilization ratio of the subcarrier signal, when a supply voltage of said battery cell detected by the power-source-information detecting portion is higher than a predetermined threshold value, **(See Rodger, col. 11 l. 66 – col. 13 l. 23, where Rodger discusses a use of upper bands of a subscan, higher bands carry less RF energy than the lower bands; therefore, raising the frequency will help the signal reach tags and save power consumption).**

Consider claim 32, Maclellan discloses the endpoint device according to claim 28, wherein said frequency-utilization-ratio setting portion is operable to select one of a plurality of different frequency-utilization-ratio distribution patterns each of which represents a relationship between said plurality of mutually adjacent frequency channels and said frequency utilization ratio of the subcarrier signal, said endpoint device including a memory storing data table representative of said different frequency-utilization-ratio distribution patterns, said frequency determining portion being operable to hop the frequency of the subcarrier signal according to the selected one of said different frequency-utilization-ratio distribution pattern, **(See Maclellan, Fig 8, col. 12 l.**

5-30, where Maclellan discusses the system is design to frequency channel within the entire frequency range of the subcarrier signals, the tag comprises the memory containing an algorithm for frequency distribution and the frequency hopping of the sub carrier signal using the algorithm).

Consider claim 33, the combination of Nysen and Rodger discloses, the endpoint device according to claim 28, wherein said frequency-utilization-ratio setting portion is operable to set the distribution of the frequency utilization ratio of the subcarrier signal so that a center frequency of said distribution is lower when said battery cell is a primary battery cell, than when said battery cell is other than said primary battery cell, **(See Nysen, col. 12 l. 45-54 and col. 13 l. 38-40, where Nysen discusses the transponder may and active such as a tag with an internal battery or a passive transponder a tag without internal battery and it is known to use lower frequency band with passive transponder because they totally depend on RF energy of a signal).**

Consider claim 35, Nysen discloses the endpoint device according to claim 28, wherein said frequency-utilization-ratio setting portion is operable to set the distribution of the frequency utilization ratio of the subcarrier signal, by changing at least an amount of data transmitted with said reflected signal and a time period during which said reflected signal is transmitted, each time the reflected signal having a selected one of said mutually adjacent frequency channels is transmitted, **(See Nysen, col. 11 l. 5 –col.**

12 l. 64, where Nysen discusses the system is design to set or shift the subcarrier frequency by changing the length of transmission of the backscatter signal i.e. changing the period of the duty cycle by changing the frequency, every time the backscatter signal transmitted one of the adjacent frequency channels).

Consider claims 40 and 41, Maclellan discloses the communication system according to claim 36, wherein said switching-information generating portion is operable to generate the switching information for raising a center frequency of the distribution of said individual frequency utilization ratio of the subcarrier signal of said each endpoint device, when said overall-frequency-utilization ratio determining portion determines that said overall frequency utilization ratio of said reflected signals in low frequency channels of said predetermined range of frequency of the subcarrier signal is higher than a predetermined threshold value, **(See Maclellan, col. 11 l. 5- col. 12 l. 63, where MacLellan, discusses the processor to adjust the center frequency of the subcarrier signal according to the channels that are receiving the backscatter signals of a high and low frequency subcarrier signal).**

Consider claim 42, Nysen discloses the endpoint device according to claim 39, wherein said plurality of endpoint devices include at least one first endpoint device wherein a primary battery cell is provided as said battery cell, and at least one second endpoint device wherein a secondary battery cell is provided as said battery cell, [the secondary battery is provided in addition to a primary battery cell in the second endpoint

device?], said switching-information generating portion being operable to generate the switching information that causes said individual-frequency-utilization-ratio setting portion of each of said at least one first endpoint device to set the distribution of said individual frequency utilization ratio of the subcarrier signal so that a center frequency of the distribution of said individual frequency utilization ratio of the subcarrier signal of said each first endpoint device is lower that that of said each second endpoint device, **(See reference , col. 13 l. 37- col. 14 l. 63, and col. 35 l. 40 - col. 36 l. 25,where Nysen discusses the some tags may include more than power source, i.e. battery cell, and the processor identifies the tags and set the channel of the carrier signal lower for a single cell tags in order to deliver more RF energy than tags with a secondary power source).**

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nysen: US 6107910 A by Nysen, and further in view of Rodger: Rodger in US 6362737 and further in view of Maclellan: US 5940006 by Maclellan, in view of Janning in US 20010040508, and further in view of Takatori: US 20010020897 by Takatori, Sunao et al.

Consider claim 34, Takatori discloses the endpoint device according to claim 28, further comprising a solar cell as a power source device, **(See Takatori, abstract and PP 26).**

Consider claim 34, Nysen does not specifically discloses the endpoint device comprising a solar cell as a power source device; nevertheless, it would be obvious to one of ordinary skill in the art at the time of invention to modify the invention of Nysen and design the tag with a solar cell as a power source as taught by Takatori to design a system in an effort to reduce the cost of power consumption by the tag, **(See Takatori PP 13-14).**

Claims 20, 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nysen: US 6107910 A by Nysen, and further in view of Rodger: Rodger in US 6362737 and further in view of Maclellan: US 5940006 by Maclellan, and further in view of Butovitsch: US 6792276 by Butovitsch; Peter et al.

Consider claim 20, Butovitsch discloses the communication system according to claim 13, wherein said available-band determining portion is operable to determine said available frequency band so that an upper limit of said available frequency band is increased when said collision rate, said number of occurrences of collision or said amount of error data which has been detected by said communication-condition detecting portion is equal to or larger than a predetermined first threshold value, and decreased when said collision rate, said number of occurrences of collision or said amount of error data is equal to or smaller than a predetermined second threshold value, **(See Butovitsch, abstract, and col. 2 l. 14-48, col. 6 38-42, col. 7l. 29-51, where Butovitsch discusses a use of frequency bands is based on the number**

subcarrier interference and the threshold value before handoff).

Consider claim 20, 22-24, Nysen does not specifically discloses the threshold values of collision rate before increasing the frequency band and the limitation directly dependent on this limitation; nevertheless, it would be obvious to one of ordinary skill in the art at the time of invention to modify the invention of Nysen and design the system where the once system receives threshold values of collision rate or noise, the frequency band modifies to eliminate the noise as taught by Butovitsch to design a system in an effort to increase the capacity of communication network and eliminate excess interference, **(See Butovitsch col. 3 l. 39-46).**

Consider claim 22, Butovitsch discloses the communication system according to claim 19, wherein said available-band determining means is operable to adjust said first and second threshold values on the basis of the number of said at least one endpoint device which has been detected by said communication-condition detecting portion, and on the basis of said collision rate, said number of occurrences of collision or said amount of error data which has been detected by said communication-condition detecting portion, **(See Butovitsch, abstract, and col. 2 l. 14-48, col. 6 38-42, col. 7l. 29-51, where Butovitsch discusses adjustment to frequency band values as a function of the number of tags are detected and the range of Q, the quality index of a signal, and amount of noise received i.e. SNR).**

Consider claims 23 and 24, Butovitsch discloses the communication system according to claim 13, wherein said available-band determining portion is operable to set an upper limit of said available frequency band at a maximum and a minimum value in an initial state of the communication system, **(See Butovitsch, col. 2 l. 14-48, col. 6 38-42, col. 7l. 1-51, where Butovitsch discusses adjustment to frequency band values as a function of the number of tags are detected and the range of Q, the quality index of a signal, and amount of noise received i.e. SNR).**

Claims 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nysen: US 6107910, and further in view of Rodger: US 6362737 and further in view of MacLellan: US 5940006, and further in view of Bahl in US 6839560.

Consider claim 46, the endpoint device according to claim 1, said distance detecting portion detecting the distance between said interrogator and said endpoint device according to an equation relating the intensity of the interrogating signal versus the distance, **See Bahl col. 10 l. 10-49, where discusses to compute distance using the equation, The signal strength at a particular location can, therefore, be defined as the signal strength as attenuated by distance and walls that the signal had to pass through. In mathematical terms, the formula can be expressed as follows: the signal strength, or power P, at a given distance d is calculated as EQU 2.**

It would have been obvious to an ordinary skilled artisan at the time of invention

to modify the invention above and use an equation as well as the table to determine the distance and using the power of the signal as one of the parameter in computing an accurate location of the wireless device and providing convenience to the user for easily locating the wireless device.

Consider claims 45 and 47, the endpoint device according to claims 1 and 12, said distance detecting portion detecting the distance between said interrogator and said endpoint device according to a stored data table indicative of a relationship between the intensity of the interrogating signal or the modulating signal with which said reflected signal has been modulated in said endpoint devices and the distance, **See Bahl, abstract, where he teaches Using a derived table of signal strength data to locate and track a user in a wireless network and to measure a distance between the base station 76 and mobile computer 78.**

The strength of the radio frequency signals measured by the base station 76 or the mobile computer 20 can vary as a function of the orientation of the mobile computer 20 when performing the measurements. More particularly, the orientation of the computer is related to the position of the user, and it is the user's body that can create a significant difference in the detected signal strength. It is therefore necessary that the table used in determining the location of the mobile computer take this effect into account and be able to determine the location regardless of the orientation of the user with respect to the mobile computer, **See Bahl col. 6 l. 30 - 42.**

Even though the signal strength measured at the mobile computer 20 and the base station 76 are similar in value, there is no requirement that they be so. The two

signals travel the same path and encounter the same obstacles which degrade the signal. The only difference can be the power of the transmitting devices themselves: the base station, since it does not need to conserve power, may be transmitting at a higher power than the wireless network interface 53 on the mobile computer 20, **See Bahl col. 8 l. 66 - col. 9 l. 7.**

The signals received by the base stations in Table 2 are weaker than those received by the mobile computer from the base stations in Table 1. However, because the signals in both directions are equally affected by distance and obstacles, the relationship between the signals in a row remains the same, **See Bahl col. 9 l. 14-19.**

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patwari, Neal K. et al. in US 20020122003 A1 discloses that each signal measurement can comprise an RSSI signal measurement which is used in conjunction with a channel model to calculate the distance between and ith device and the responding device. See ¶ 166.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Omer S. Khan whose telephone number is (571)270-5146. The examiner can normally be reached on M-F 7:30 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian A. Zimmerman can be reached on 571-272-3059. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Omer S Khan/
Examiner, Art Unit 2612

/Brian A Zimmerman/
Supervisory Patent Examiner, Art Unit 2612